Gasoline Prices and Drunk-Driving Crashes

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Introduction

In 2008, there were more than 300,000 alcohol-related automobile crashes in the United States (NHTSA, 2009). While drunk-driving crashes have declined substantially over the past three decades, drunk driving is still a serious problem and the leading cause of deaths on highways (NHTSA, 2009). Alcohol consumption has been found to explain much of the variation in drunk-driving crashes (Berger and Snortum, 1986; Young and Bielinska-Kwapisz, 2006), but drunk-driving crashes may also be affected by gasoline price changes. Gasoline prices are found to affect automobile crashes negatively in general––higher gasoline prices lead to fewer traffic crashes (e.g., Grabowski and Morrisey, 2004; Wilson et al., 2009). However, there does not appear to be any studies that have investigated the effects of gasoline prices on drunk-driving crashes.

Most empirical evidence suggests that alcohol consumption decreases during poor economic conditions, causing the number of drunk-driving crashes to decrease. Also, drivers may switch to public transportation when gasoline prices increase. These points suggest that rising gasoline prices would correlate with fewer drunk-driving crashes. However, evidence also suggests that people drink more alcohol when facing more stress, and rising gasoline prices could contribute to this stress, particularly for more vulnerable populations. The goal of this research was to empirically test these opposing hypotheses and how the effects of gasoline price on drunk-driving crashes may vary by age, gender, and race.

"... for every 10% increase in gasoline prices, there is a 2.1% decrease in total drunk-driving crashes."

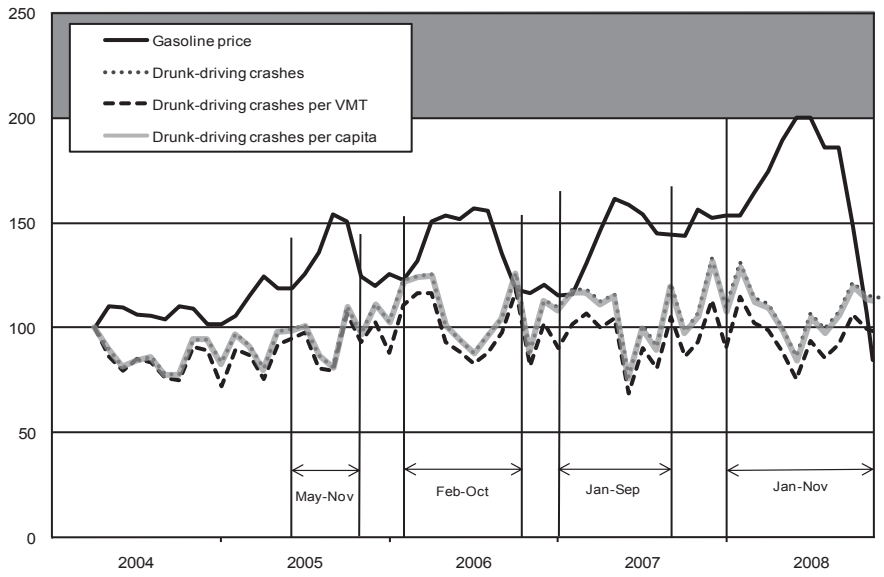
Data

The Mississippi Highway Patrol provided data on drunk-driving crashes and all crashes (both by fatal, injury, and Property-damage-only [PDO] categories) by age, gender, and race in Mississippi at the monthly level from April 2004 to December 2008. Monthly per-gallon prices for regular-grade unleaded gasoline are from the U.S. Department of Energy's Energy Information Administration. Other variables such as alcohol consumption (from the Beer Institute), unemployment rate (from the U.S. Bureau of Labor Statistics), and seat belt usage (from an annual roadside survey of Mississippi drivers conducted by Mississippi State University) could affect the relationship between gasoline price and drunk-driving crashes, so these additional variables were included in the analysis.

Results

Our statistical analyses show that higher gasoline prices are associated with fewer drunk-driving crashes. Figure 1 one visualizes the negative relationship between gasoline prices and drunk-driving crashes for male and female drivers, particularly during the highlighted periods where gasoline prices peak and number of drunk-driving crashes dives. Higher gasoline prices depress drunk-driving crashes among young and adult drivers, among male and female drivers, and among white and black drivers. When alcohol consumption levels are higher, there are more drunk-driving crashes, particularly fatal and injury crashes. The effects of gasoline prices and alcohol consumption are stronger on drunk-driving crashes than on all crashes. The findings do not vary much across different demographic groups. Overall, gasoline prices have greater effects on less severe crashes and alcohol consumption has greater effects on more severe crashes.

Figure 1. Gasoline prices and drunk-driving crashes, April 2004–December 2008, Mississippi.



Note: VMT stands for "vehicle miles traveled." This measure accounts for the total amount of miles traveled my Mississippians. Also "per capita" accounts for the population of Mississippi.

For drunk-driving crashes, gasoline prices have effects on PDO crashes but not on fatal and injury crashes. The fact that gasoline prices have greater effects on less severe crashes may be because higher gasoline prices are more likely to deter lighter drinkers from drunk driving. In contrast, higher gasoline prices are less likely to deter heavier drinkers from drunk driving, as heavier drinkers are less likely to change driving behaviors due to gasoline price changes and may even drink more in response to economic stress.

To give these abstract observations a more concrete reality, our analysis shows that for every 10% increase in gasoline price, there is a 2.1% decrease in total drunk-driving crashes. For that same 10% increase in gasoline price, drunk-driving crashes for young drivers (15-23), female drivers, and black drivers decrease by 3.3%, 3.9%, and 4.8%, respectively. These percentages indicate that gasoline price has a substantial effect on the number of drunk-driving crashes is Mississippi.

Policy Considerations

Alcohol-impaired driving is hazardous to everyone on the road and strict laws and enforcement have shown progress in altering this behavior. Research shows that stricter enforcement relating to repeat offenders may decrease fatalities and injuries. Zero tolerance for minors, mandatory jail time, and additional child endangerment charges may have influenced the recent trend in DUI arrests and alcohol-related fatalities in Mississippi.

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